

FIELD INVESTIGATION PHOTOGRAPH ALBUM

**OPERABLE UNIT NO. 1
(SITES 21, 24, AND 78)**

**MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA**

CONTRACT TASK ORDER 0177

JANUARY 27, 1995

Prepared For:

**DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES
ENGINEERING COMMAND
*Norfolk, Virginia***

Under:

**LANTDIV CLEAN PROGRAM
Contract N62470-89-D-4814**

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LIST OF ACRONYMS AND ABBREVIATIONS

CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
DEHNR	Department of the Environment, Health, and Natural Resources
DoN	Department of the Navy
EPA	Environmental Protection Agency
EPIC	Environmental Photographic Interpretation Center
FFA	Federal Facilities Agreement
FS	Feasibility Study
HPIA	Hadnot Point Industrial Area
MCB	Marine Corps Base
NPL	National Priorities List
OU	Operable Unit
PCB	Polychlorinated Biphenols
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure

1.0 INTRODUCTION

Marine Corps Base (MCB), Camp Lejeune was placed on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List (NPL) effective October 4, 1989 (54 Federal Register 41015, 1989). Subsequent to this listing, the United States Environmental Protection Agency (EPA) Region IV, the North Carolina Department of the Environment, Health, and Natural Resources (DEHNR), and the United States Department of the Navy (DoN) entered into a Federal Facilities Agreement (FFA) for MCB, Camp Lejeune.

The FFA included the implementation of a remedial investigation/feasibility study (RI/FS) at sites throughout MCB, Camp Lejeune. This Field Investigation Photograph Album describes the RI field activities that have been conducted at three of the sites. These sites include: Site 78 (Hadnot Point Industrial Area), Site 21 (Transformer Storage Lot 140), and Site 24 (Industrial Area Fly Ash Dump). The three sites comprise Operable Unit (OU) Number 1 (see Figure 1-1).

1.1 Purpose and Format of the Field Investigation Photograph Album

This purpose of this photograph album is to provide the DoN and Marine Corps with a brief overview of the RI field activities. The objective of the RI is to evaluate the nature and extent of the threat or potential threat to public health and the environment caused by the release or threatened release of hazardous substances, pollutants, or contaminants. The field activities were conducted by Baker Environmental, Inc. (Baker) for the DoN from April 1993 through June 1993. This album contains representative site and site activity photographs.

The Field Investigation Photograph Album is formatted as follows. Section 1.0 provides an introduction, and the purpose and format of the photograph album. Section 2.0 provides a brief overview of the sites and site photographs. Section 3.0 provides descriptions of general investigation procedures (i.e., groundwater investigation) conducted at each site, and specific investigations for each sites. Photographs are provided, depicting the investigation activities.

The photographs are numbered according to the following scheme:

Operable Unit No., Site No., or Investigation, Year, Photograph No.

An explanation of each identified follows.

Operable Unit No.: The field investigation was Operable Unit No. 1

Site No.: Investigation conducted at Sites 21, 24, and 78.

Investigation No.: GW = Groundwater investigation

SL = Soil Investigation

Year: The investigation was conducted in 1993.

Photograph No.: The photograph number indicates the sequential order of photographs grouped according to Site No. or Investigation

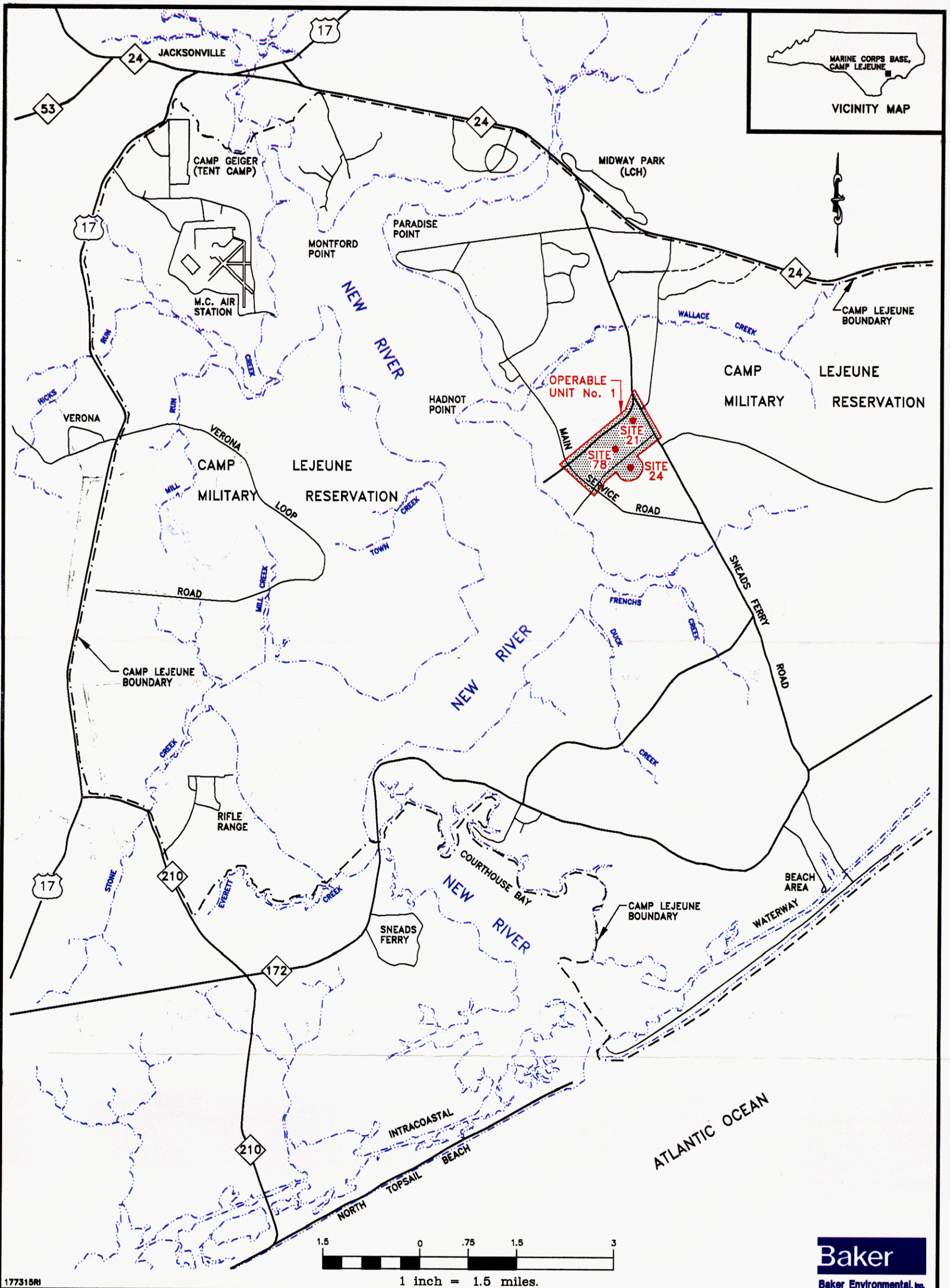


FIGURE 1-1
LOCATION MAP-OPERABLE UNIT No. 1
SITES 21, 24 AND 78
REMEDIAL INVESTIGATION CTO-0177
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

2.0 SITE CHARACTERISTICS

This section provides a description of each site location and setting, and a brief history of site waste disposal activities for OU No.1.

2.1 Site 78 (Hadnot Point Industrial Area)

The following provides the site location and setting for Site 78.

2.1.1 Site Location and Setting

Site 78, the Hadnot Point Industrial Area (HPIA), houses the industrial area of MCB Camp Lejeune. HPIA covers approximately 590 acres and is generally defined as the area bounded by Holcomb Boulevard to the west, Sneads Ferry Road to the north, Duncan Street to the east, and the Main Service Road to the south (see Figure 1-1). This area is comprised of maintenance facilities, warehouses, painting shops, auto body shops, etc. Much of the area is paved (e.g., roadways, parking lots, loading dock areas, and storage lots), however, there are many lawn areas associated with the individual buildings at HPIA and along lengthy stretches of roadways. In addition, there are many areas of open unpaved lots along with many acres of wooded areas.

2.1.2 Site History

The HPIA was the first facility at MCB Camp Lejeune and was constructed in the late 1930s. It is comprised of approximately 75 buildings and facilities including: maintenance shops, gas stations, administrative offices, commissaries, snack bars, warehouses, and storage yards.

There is presently no known uncontrolled disposal of wastes related to the various industrial activities at the site. Due to the industrial nature of the site, many spills and leaks have occurred over the years. Most of these spills and leaks have consisted of petroleum-related products and solvents from underground storage tanks, drums, and uncontained waste storage areas.



OU1.Site78.1993.01 Building 1103 at HPIA. Monitoring well in foreground. Once used for paint storage.



OU1.Site78.1993.02 Building 1300 at HPIA. Monitoring well in foreground. Identified as a refrigeration maintenance shop. Also used for solvent storage.



OU1.Site78.1993.03 Building 1502 at HPIA along Elm Street. Underground Storage Tanks discovered in this area. Monitoring well to the left.



OU1.Site78.1993.04 Building 1502 at HPIA along Elm Street. Pesticides were identified in the grassy area shown.



OU1.Site78.1993.05 Corner of Gum Street and East Road at HPIA. Building 1601 on left; Building 1502 on the far left. These are UST areas.

SITE 78



OU1.Site78.1993.06 Closeup of Buildings 1601 and 1502. Areas of concern due to USTs and significant solvent use.



OU1.Site78.1993.07 UST area at HPIA. Buildings 901, 902, and 903. Significant solvent (TCE) use at this area.



OU1.Site78.1993.08 Northern end of Building 160 along Fir Street. Used for maintenance. Has inactive USTs.



OU1.Site78.1993.09 Typical HPIA buildings along East Road (corner of Building 1103, Building 1202 in rear).

2.2 Site 21 (Transformer Storage Lot 140)

The following provides the site location and setting for Site 21.

2.2.1 Site Location and Setting

Site 21 is located within the northwest section of Site 78 (HPIA). The site is bordered by Ash Street to the southwest, Center Road to the southeast, and a wooded area to the northwest (see Figure 1-1). A dirt road surrounds most of the site. Site 21 is primarily an open lot, with fenced areas to the south and open areas to the north. The site consists of grassy, gravel, and concrete areas.

2.2.2 Site History

Lot 140 has a history of pesticide usage and transformer oil disposal. The site was used as a pesticide mixing area and as a cleaning area for pesticide application equipment from 1958 to 1977. The area where this activity occurred is believed to be located in the southeast corner of the lot (the exact location is not documented). It is believed that the chemicals stored at this site included diazinon, chlordane dust, lindane, DDT dust, malathion (46 percent solution), mirex, 2,4-D, silvex, dalpon, and dursban. Small spills, washout and indiscriminate disposal is believed to have occurred in this area. In 1977, before these mixing/cleaning activities were moved to a different location, overland discharge of washout was estimated to be approximately 350 gallons per week. It is not clear for how long this discharge of washout occurred.

A former transformer oil disposal pit was reportedly located in the northeastern portion of the site. The pit was used as a disposal area for transformer oil during 1950-1951. The pit reportedly measured 25 to 30 feet long by 6 feet wide by 8 feet deep. Sand was occasionally placed in the pit when oil was found standing in the bottom of the pit. The total quantity of oil disposed in this pit is unknown.



OU1.Site21.1993.01 Northern portion of Site 21 where the Former Transformer Disposal Area was reportedly located.

SITE 21



OU1.Site21.1993.02 Northern portion of Site 21 where the Former Transformer Disposal Area was reportedly located. Sampling location is marked by a stake wrapped with flagging tape.

SITE 21



OU1.Site21.1993.03 Middle portion of Site 21. Area includes Building 1014 which had been used for paint storage.

SITE 21



OU1.Site21.1993.04 View of southern half of Site 21; site area is between the trees in the back and the fenceline behind the railroad tracks. The water tower is within the site.



OU1.Site21.1993.05 Closeup view of the fenced in area southwest of the water tower and Building 1013. Potential pesticide mixing/wash area.



OU1.Site21.1993.06 Southern-most fenced-in area of Lot 140. Currently used for storage of vehicles and other items. Suspected pesticide contaminated area.



OU1.Site21.1993.07 Southeast portion of Lot 140 (left of the railroad tracks). Area believed to be the location of the pesticide mixing and pesticide equipment cleaning area.

2.3 Site 24 (Industrial Area Fly Ash Dump)

The following provides the site location and setting for Site 24.

2.3.1. Site Location and Setting

Site 24 is located adjacent to the southeastern portion of Site 78 (see Figure 1-1). Specifically, the site is located south and east of the intersection of Birch and Duncan Streets and extends south towards Cogdels Creek. The site is approximately 100 acres in size and is a wooded area that is somewhat overgrown. Dirt roads are interspersed throughout which lead to the suspected disposal sites. Several areas indicating past disposal activities are evident throughout the site. Site 24 is not currently used for disposal of wastes.

2.3.2 Site History

Site 24 was used for the disposal of fly ash, cinders, solvents, used paint stripping compounds, sewage sludge, and water treatment spiractor sludge from the late 1940s to 1980. Spiractor sludge from the wastewater treatment plant and sewage sludge from the sewage treatment plant were reportedly disposed at this site since the late 1940s. Construction rubble was reportedly disposed at this site in the 1960s. During 1972 to 1979, fly ash and cinders were dumped on the ground surface, and solvents to clean out boilers were poured onto these piles. Furniture stripping wastes were also disposed at this area during this time period.

Previous reports have identified four separate disposal areas within the site: a spiractor sludge disposal area, a fly ash disposal area, and two borrow and debris areas. The recent geophysical survey investigation conducted at the site confirmed the general location of three of these disposal areas in addition to locating two buried metal areas. One of the borrow and debris areas could not be identified. Based on a review of the Environmental Photographic Interpretation Center (EPIC) aerial photographs of the site, the second borrow and debris area may have been a mound of material that was present at the site during 1943-1944. No other activities were noted in this area, so it is possible that it might not have been a disposal area.

SITE 24



OU1.Site24.1993.01 Newly installed monitoring well in center of this area of Site 24.



OU1.Site24.1993.02 Baker personnel unlocking outer casing of monitoring well at Site 24 prior to groundwater sampling.

3.0 FIELD INVESTIGATIONS

The following section provides descriptions of the general investigations conducted at OU No.1 and of the specific investigations conducted at each site.

3.1 Specific Investigations

This subsection describes the specific field investigations conducted at each of the three sites.

3.1.1 Site 78

Preliminary RI investigation activities included geophysical survey and groundwater sampling. The geophysical survey investigation was conducted to identify suspected underground storage tank areas at Buildings 903, 1502, and 1601. Several tanks were identified. The results are summarized in a separate report found as Appendix C in the RI. Groundwater samples were also collected in July 1992 from selected monitoring wells at Sites 78, 24, and potable water supply wells HP-602 and HP-637. The sampling data provided current groundwater quality data used to develop the sampling strategies for the RI field investigation.

The following RI field investigations were conducted at Site 78:

- Surveying
- Soil gas survey
- Soil investigation
- Groundwater investigation
- Surface water/sediment investigation

All existing monitoring wells were surveyed.

The soil gas survey was conducted to investigate potentially contaminated areas which may have resulted from previous and/or present waste (e.g. solvents, petroleum, etc.) usage/storage. Based on historical information, there are three groups of buildings within HPIA which may be of potential concern. These areas include: (1) suspected underground storage tank locations identified during

the geophysical survey investigation at Buildings 903, 1502, and 1601; (2) Building 1300; and (3) Buildings 1103 and 1601. During the investigation, samples of soil gas and groundwater were analyzed on site via a gas chromatograph. A total of 36 building areas located in proximity to the areas of concern were investigated as part of the survey. The final soil gas survey is presented as Appendix D in the RI.

A number of the buildings within Site 78 were used for the storage/usage of solvents, petroleum, oil, lubricants, pesticides, and PCB-containing fluid. Soil investigations focused on the following areas of concern: (1) suspected underground storage tank locations identified during the geophysical survey investigation at Buildings 903, 1502, and 1601; (2) Building 1300; and (3) Buildings 1103 and 1601.

Soil investigation included obtaining surface and subsurface soil samples from both exploratory and monitoring well boreholes. The field team also used hand augers to obtain samples.

Groundwater investigations were conducted at Site 78 to assess groundwater quality at HPIA. Seven shallow monitoring wells were installed at locations based on the results of the soil gas survey as well as other factors. One round of groundwater samples and water level measurements were collected from all existing and newly installed wells at the site.

Surface water and sediment investigations were conducted in several drainage tributaries around Site 78 to assess possible impacts to Cogdels Creek and the New River; to Beaver Dam Creek and Wallace Creek, and to the environment. The surface water and sediment investigations pertain to the entire operable unit. A total of 30 surface water samples were collected at OU No.1: 7 from Beaver Dam Creek; 15 from Cogdels Creek; 5 from the New River; 1 from an unnamed tributary to the New River; and 3 from the drainage ditch encompassing Site 21 (this sample pertains to Site 21 only).

3.1.2 Site 21

The following investigations were conducted at Site 21 during the RI:

- Surveying
- Soil investigation
- Groundwater investigation
- Surface water/sediment investigation

All existing monitoring wells and the three new wells installed at Site 21 were surveyed.

The soil investigation was conducted to assess the nature and extent of contamination which may have resulted from previous disposal practices or site activities. At Site 21, the soil investigation focused on two areas of concern: the former pesticide mixing area (both inside and outside of the fenced-in area) and the former transformer disposal pit. Reportedly, portions of Lot 140 were used as a pesticide mixing area (i.e., the Former Pesticide Mixing/Disposal Area), and as a cleaning area for pesticide application equipment from 1958 to 1977. The Former Transformer Disposal Area was reportedly located in the northeastern portions of the site.

Soil investigation included obtaining surface and subsurface soil samples from both exploratory and monitoring well boreholes. The field team also used hand augers to obtain samples. A total of 13 borings were advanced to assess the Former Pesticide Mixing/Disposal Area and a total of 18 borings were advanced to assess the Former Transformer Disposal Area. Based on data received from the "quick" turnaround time (i.e., sample analyzed within seven days) for the surface samples, three additional borings were advanced to further evaluate the extent of contamination near the Former Pesticide Mixing/Disposal Area.

Groundwater investigations were conducted at Site 21 to assess groundwater quality at the former pesticide mixing area and at the former transformer oil disposal pit area. Historical documents indicated that several areas within Site 21 may have been impacted from previous disposal practices and site activities. One round of groundwater samples and water level measurements were collected from all existing wells at the site and the three newly installed wells.

Surface water and sediment investigations were conducted in the drainage ditch surrounding Site 21 to assess possible impacts to this drainage ditch and to the environment from the two areas of concern at the site. The surface water and sediment investigation conducted at Site 78 pertains to the entire OU No.1.

3.1.3 Site 24

Preliminary RI investigation activities conducted at Site 24 included geophysical survey and groundwater sampling. The geophysical survey investigation was conducted at Site 24 to delineate the boundaries of the four suspected disposal areas: Spiractor Sludge Disposal Area; Fly Ash Disposal Area; Borrow and Debris Disposal Area; and Buried Metal Disposal Area. Due to ongoing construction, the suspected Borrow and Debris Disposal Area was not able to be studied. Locations of buried metal at all three disposal areas were identified for subsequent investigation via test pits. The survey also located two potential buried metal areas. The final geophysical results are summarized in a separate report found as Appendix C in the RI.

Groundwater samples were also collected in July 1992 from selected monitoring wells at Sites 78, 24, and potable water supply wells HP-602 and HP-637. The sampling data provided current groundwater quality data used to develop the sampling strategies for the RI field investigation.

The following investigations were conducted at Site 24 during the RI:

- Surveying
- Soil investigation
- Groundwater investigation

All existing monitoring wells and the four new wells installed at Site 24 were surveyed.

The soil investigation was conducted throughout Site 24 but was focused primarily on four areas of concern: the Spiractor Sludge Disposal Area; Fly Ash Disposal Area; Borrow and Debris Disposal Area; and Buried Metal Disposal Area. Soil investigation included obtaining surface and subsurface soil samples from both exploratory and monitoring well boreholes. The field team also used hand augers to obtain samples. Eleven borings were advanced within the Spiractor Sludge Disposal Area;

17 borings were advanced within the Buried Metal Disposal Area (which included the Fly Ash Disposal Area); and 13 borings were advanced within the Borrow and Debris Disposal Area.

Test pit sampling activities were conducted at Site 24 to further investigate the nature and extent of contamination, and to visually identify the reported buried waste material. A total of eight excavations were performed. Samples were collected from areas containing suspected disposal material as well as at the bottom of each pit to provide information on the vertical extent of contamination. Samples were collected directly from the backhoe bucket.

Groundwater investigations were conducted at Site 24 to assess groundwater quality at the four areas of concern at the site. Four new shallow groundwater monitoring wells were installed. One round of groundwater samples and water level measurements were collected from all existing wells at the site and the four newly installed wells.

3.2 General Investigations

This following subsection briefly describes the general investigative procedures employed during the field program.

3.2.1 Groundwater Investigations

Groundwater investigation focused on evaluating surficial and deeper groundwater quality. The investigation included drilling/monitoring well installation, well development, groundwater sampling, and static water level measurements. The monitoring wells were placed according to reported storage/disposal areas, results of a geophysical survey investigation, review of historical aerial photographs, and preliminary results from soil sample results.

For this project, Type II shallow (i.e., wells installed without outer casing to seal off a confining layer) monitoring wells were installed. The wells were constructed of 4-inch PVC casing with a 0.01-inch slotted screen. A medium-grained sand pack (number 2 silica sand), extending approximately 2-feet (where conditions permitted) above the top of the screen, was placed between the borehole wall and the screen. A 2- to 3-foot bentonite pellet seal was then placed above the sand pack. The remaining annular space was backfilled with a mixture of Portland cement and 5 percent

bentonite. A pad was then constructed. An above ground protective steel casing and a PVC locking cap were installed at the top of each well.

Following well construction, each well was developed in order to remove the fine-grained sediments and to establish a hydraulic connection between the well and the formation. The newly installed monitoring wells were developed using a combination of surging and pumping (centrifugal pump). Investigation-derived wastes generated during this investigation (i.e., purge water, development water, drilling mud) were containerized and sampled for assessment of disposal options.

Groundwater samples were collected from both newly installed and existing monitoring wells. The samples generally analyzed for full TCL organics and TAL inorganics (total and dissolved metals analysis). The groundwater investigation also included several rounds of water level measurements which included staff gauges which were installed in Beaver Dam Creek and Cogdels Creek. Groundwater sampling procedures were performed in accordance with USEPA Region IV guidelines.

Photographs depicting the groundwater investigation activities follow.

GROUNDWATER



OU1.GW.1993.01 Field crew advancing a boring. Crew member on the left is monitoring the borehole with an HNu for health and safety.

GROUNDWATER



OU1.GW.1993.02 Rod with the split spoon sampler being raised from the borehole.

GROUNDWATER



OU1.GW.1993.03 Mobile All Terrain Vehicle drilling rig setting up.

GROUNDWATER



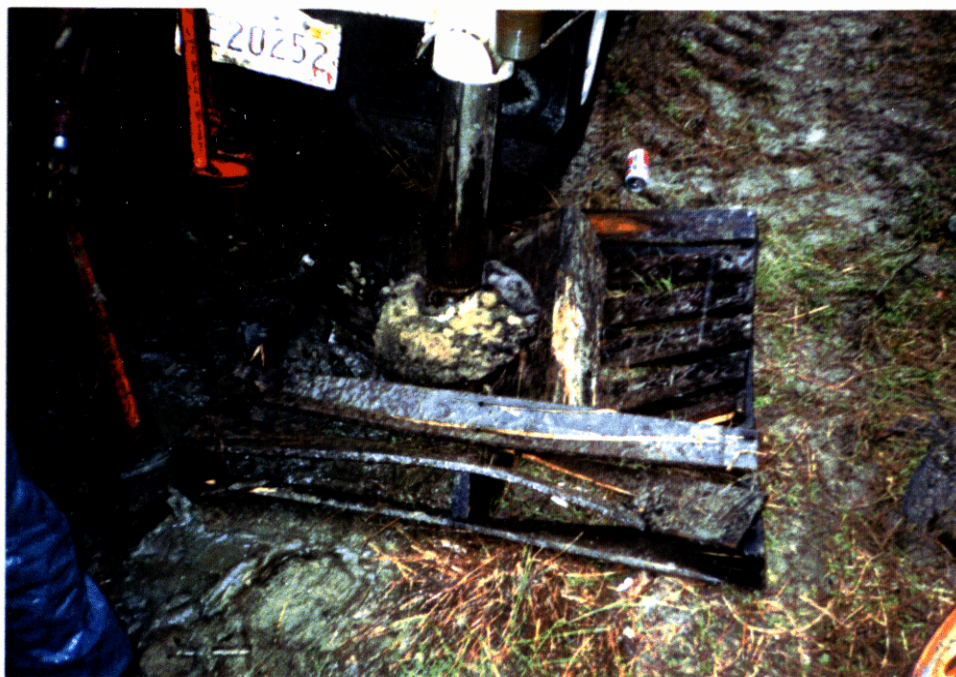
OU1.GW.1993.04 Mud rotary drilling set up.

GROUNDWATER



OU1.GW.1993.05 Field personnel installing PVC pipe for monitoring well.

GROUNDWATER



OU1.GW.1993.06

View of truck mounted drill, and casing installation.

GROUNDWATER



OU1.GW.1993.07

Closeup of borehole and casing installation. Grout/bentonite mixture filling up space between casing and borehole wall.

3.2.2. Soil Investigation

The soil investigation conducted at OU No.1 was performed to assess the nature and extent of contamination which may have resulted from previous disposal practices or site activities. Additionally, the investigations were performed to assess human health, ecological, and environmental risks associated with exposure to surface and subsurface soils. The drilling and sampling program focused on suspected disposal/storage areas.

Drilling operations employed a truck mounted drill rig and the use of hollow-stem augers. Surface (i.e., 0 to 12 inches) and subsurface soil samples were collected to evaluate the horizontal and vertical extent of potentially impacted soils. Surface soil samples were collected using a decontaminated stainless steel spoon. Subsurface soils were collected with a decontaminated split-spoon sampler. Soil sampling was conducted in accordance with USEPA Region IV guidelines. Drill cuttings were containerized, sampled, and analyzed in order to evaluate disposal options.

Depending on the site, and location within the site, the soils were analyzed for either Target Compound List (TCL) pesticides and herbicides; TCL PCBs; full TCL organics and Target Analyte List (TAL) metals; TAL inorganics; or TCL volatiles. In addition these analyses, a limited number of samples were collected and analyzed for both geotechnical and chemical engineering parameters. Chemical parameters (total TCLP and RCRA hazardous characteristics) were analyzed in order to evaluate process and disposal options for treatment of potentially impacted soils. Geotechnical parameters (grain size, Atterberg limits) were collected for evaluation of subsurface physical conditions.

Photographs depicting soil investigation activities follow.

SOIL



OU1.SL.1993.01

Test pit operations performed as an exploratory excavation to assess the contents of past disposal burial operations. Investigation conducted in "Level B" health and safety protective gear.

SOIL



OUI.SL.1993.02

Field personal decontaminating soil sampling equipment.

SOIL



OU1.SL.1993.03

Field personnel collecting subsurface soil samples at suspected **UST** area.

4.0 REFERENCES

Baker Environmental, Inc. Final Remedial Investigation Report for Operable Unit No. 1 (Sites 21, 24, and 78) Marine Corps Base, Camp Lejeune, North Carolina. June 1994.

Baker Environmental, Inc. Final Remedial Investigation/Feasibility Study Work Plan for Operable Unit No. 1 (Sites 21, 24, and 78) Marine Corps Base, Camp Lejeune, North Carolina. March 11, 1993.